



Begin

REEL # 230

Klassen, KhI.

KLASSEN Kh. I.

USSR/Farm Animals. Cattle

Q-2

Abs Jour : Ref Zhur - Biol., No 19, 1958, No 88057

Author : Klassen Kh.

Inst : -

Title : Methods of Simplified Judging of Cattle

Orig Pub : Sots. tvarinnitstvo, 1957, No 10, 38-41

Abstract : No abstract

Card : 1/1

KLASSEN, Kh.I., kand. sel'skokhozyaystvennykh nauk.; MIKHNOVSKIY, D.K., kand.  
biol. nauk.; SMIRNOV, I.V., kand. biol. nauk

New methods and forms in breeding. Zhivotnovodstvo 20 no. 10:59-64  
0 '58. (MIRA 11:10)  
(Artificial insemination)

KLASSEN, Kh.I., kand.sel'skokhos.nauk; SMIRNOV, I.V., kand.biolog.  
nauk

Urgent problems in the work of stations for artificial insemination. Zhivotnovodstvo 21 no.10:15-23 0 '59.  
(MIRA 13:2)

1. Kiyevskaya opytная stantsiya zhivotnovodstva "Terezino".  
(Ukraine--Artificial insemination)

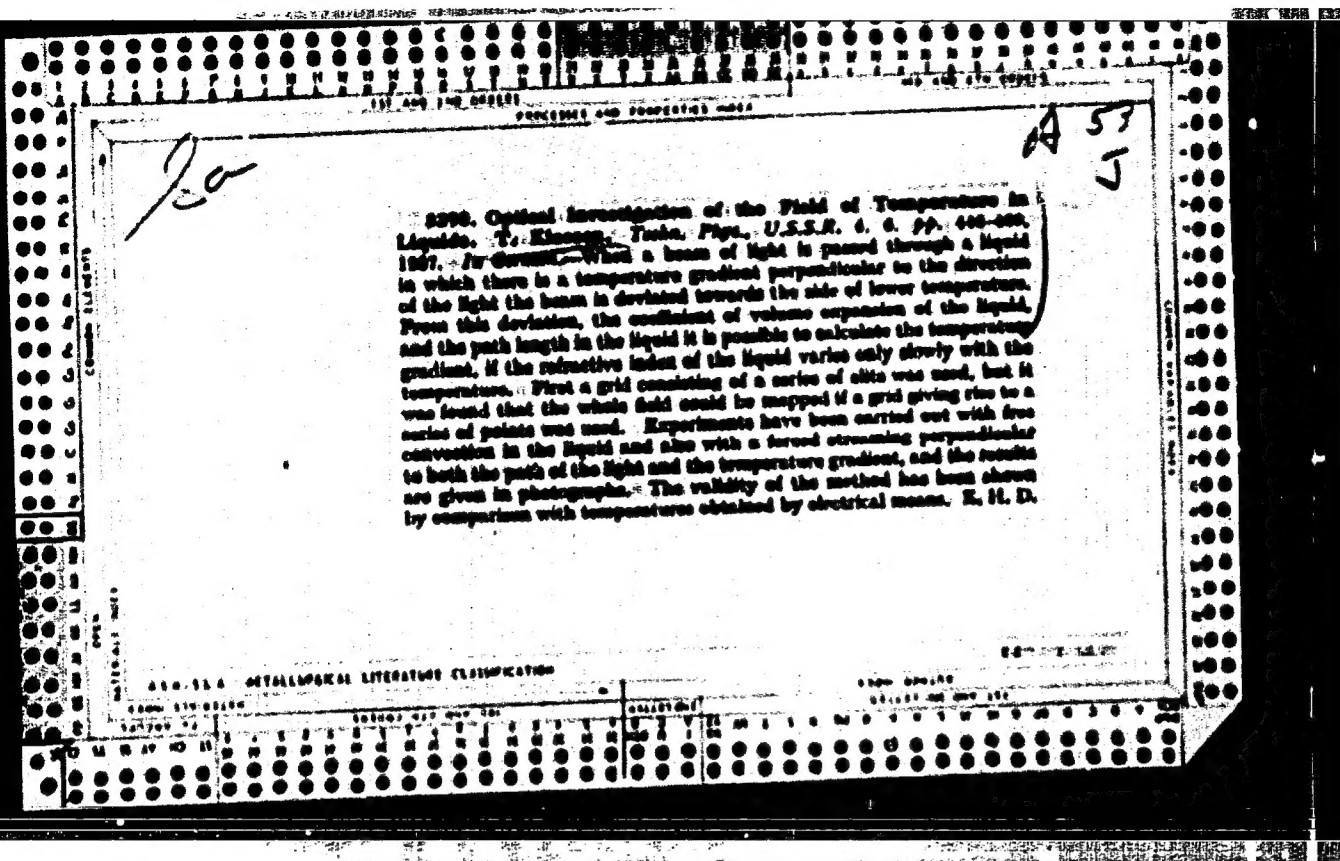
KUKOLEVA, M.I.; CHACHINA, Ye.F.; KLASSEN, O.O.; NISHCHIY, V.A.

Three observations on resanimation. Vest. khir. 93 no.8:94-95 Ag '64.  
(MIRA 18:7)

1. Iz khirurgicheskogo otdeleniya (sav. - M.I.Kukoleva) mediko-sanitarnoy chasti zavoda imeni Lenina, geroda Zlatoust, Chelyabinskoy oblasti.









S/058/60/000/009/001/004

A005/A001

11.4100

Translation from: Referativnyy zhurnal, Fizika, 1960, No. 9, p. 150, # 23028

AUTHORS: Nikol'skiy, N.A., Kulakutskaya, N.A., Pchelkin, I.M., Klassen,  
T.V., Vel'tishcheva, V.A.

TITLE: The Thermophysical Properties<sup>71</sup> of Certain Metals and Alloys in Molten State

PERIODICAL: V sb.: Vopr. teploobmena. Moscow, AN SSSR, 1959, pp. 11-14

TEXT: The designs of experimental units and investigation methods are described in detail, as well as the results from measurements of the coefficients of heat conductivity, heat capacity, kinematic viscosity, and the specific gravity of molten metals and alloys. The results obtained by the Energeticheskii Institut AN SSSR (Power Engineering Institute of the Academy of Sciences USSR) are compared with the results obtained by other authors. Tables of the thermophysical properties of <sup>1</sup>Hg, molten <sup>1</sup>Sn, <sup>1</sup>Pb, <sup>1</sup>Bi, of the alloy Pb(44.5%)-Bi, <sup>1</sup>Li, <sup>1</sup>Na, <sup>1</sup>K, and the alloy Na(75%)-K for a wide temperature range are presented. There are 41 references.

T.V. Zakharova

Translator's note: This is the full translation of the original Russian abstract.  
Card 1/1

24(1) 507/1826

PHASE I BOOK EXPLOITATION

Alimovskiy msk 5535. Energeticheskii Institut

Topologicheskii i topologicheskii (Heat Transfer and Modeling of Heat Processes) Moscow, Izdat. AN SSSR, 1959. 419 p. Errata slip inserted. 1,500 copies printed.

Reep. Ed.: R. A. Kuznetsov, Academician, Ed. of Publishing House: D. A. Ivanov, Tech. Ed.: G. N. Shvachko.

PURPOSE: The book is intended for scientists concerned with heat transfer, heat exchange, and hydraulics of liquid metals, etc.

CONTENTS: This collection is dedicated to the memory of Academician N. V. Kuznetsov who in the twenties initiated a systematic investigation of heat transfer processes and the efficiency of heat exchangers. Later he led the development of research work in this field. The special collection devoted to works of Kuznetsov's school has been published in 1959. Materially advanced in the field of heat transfer, the book is intended for scientists and engineers. It contains a bibliography of the literature on heat transfer and in the field of heat exchangers. The present collection prepared in 1956 represents further development of the work of this school. This theory is fundamental for the analysis of many heat problems in the field of electrical and radio engineering. Of great importance are the first systematic investigations of heat transfer in the field of hydraulics of liquid metals which as a result of the development of the theory of heat transfer, a dependence of the process on the kind of liquid, temperature, pressure, direction of the heat flow, and other factors, was discovered and established. On the basis of a wide generalization of experimental data, new dependable recommendations for heat analysis of engineering equipment were developed. Of no less interest is the work on heat transmission in boiling liquids and the theory of film boiling. All investigations are based on the theory of similarity, the nature of which, according to N. V. Kuznetsov, is that of a regular regime. The book is intended for a regular regime applied to a system of bodies with an internal source of heat is of interest for the future.

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Figure 1.1. Heat Conductivity and Specific Weight of Heavy

64

The coefficient of heat capacity was established by the capillary method and the specific weight of heavy water was determined by the method of hydrostatic weighing with analytical weights. The tested sample contained 99.5 percent heavy water. There are 4 Soviet references.

NOV/96-59-2-16/18

**AUTHORS:** Nikol'skiy, N.A., Candidate of Technical Sciences  
Kalakutskaya, N.A., Candidate of Technical Sciences  
Pchelkin, I.M., Engineer,  
Klassen, T.V., Engineer, and  
Vel'tishcheva, V.A., Engineer

**TITLE:** The Thermal Physical Properties of Molten Metals (Teplo-fizicheskiye svoystva rasplavlennyykh metallov)

**PERIODICAL:** Teploenergetika, 1959, Nr 2, pp 92-95 (USSR)

**ABSTRACT:** At the Power Institute Academy of Sciences USSR studies have been made of the thermal-physical properties of a number of metals and alloys in the molten condition. The extensive experimental data obtained has been critically analysed and presented in the form of tables. This article gives the thermal physical properties of mercury, lead, bismuth, tin, lithium, sodium and potassium and alloys of sodium and potassium and lead and bismuth, see tables 1 to 9. The values of specific gravity, specific heat, coefficient of thermal conductivity and coefficient of kinematic viscosity are considered to be the most reliable ones available. Test methods used to

Card 1/2

SOV/96-59-2-16/18

The Thermal Physical Properties of Molten Metals

determine some of the properties are briefly described and a diagram of the apparatus for measuring the specific gravity of molten metal by a volumetric method is given in Fig 1 and the apparatus for the displacement method in Fig 2. The equipment used for determining the thermal conductivity of molten metal is shown in Fig 3 and a further method in Fig 4. The equipment for determination of the specific heat of molten metal is shown in Fig 5. There are 5 figures and 12 references of which 7 are Soviet, 3 German, 1 English and 1 French.

Card 2/2

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7

**Dressing of Bulgarian waste of the Kalanguvash mine.**  
**M. A. Klyats and V. I. Klyats.** *Trans. All-Union Sci. Research Inst. Econ. Mineral. No. 127, 107-10 (1960).*  
 The wastes contained CaF<sub>2</sub> 70-72, SiO<sub>2</sub> 18.4, Fe<sub>2</sub>O<sub>3</sub> 4.1, Al<sub>2</sub>O<sub>3</sub> 2.9, FeO 0.7, SO<sub>2</sub> 0.2 and CaCO<sub>3</sub> 0.04%. The wastes were dressed by several flotation schemes but best results were obtained by decaying the material preparatory to flotation. Decaying increased the CaF<sub>2</sub> by 2.9% but resulted in a const. concentrate. Eten. was 92.9% and the concentrate had an av. of 90.3% CaF<sub>2</sub>.  
 B. Z. Kamsh

050-56.6 METALLURGICAL LITERATURE CLASSIFICATION

1500-170-00100

1500-00000

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<p><i>Ch</i></p> <p><b>EXPERIMENTAL STUDY ON THE SPEED OF ROTATION</b>  V. I. Khramov. <i>Zhurnal Khim. Mekh.</i>, 1959, No. 10-11, 68-72.  It is pointed out that the decrease in the rate of rotation when the rate of solid:liquid ratio exceeds limits is explained mainly by the fact that rotation in thick pulp becomes difficult. Expts. were made to prove this contention. Air contents in various locations are determined by means of a specially constructed app. previously described (C. A. 24, 2645) and interpreted statistically. A sample was used consisting of 90% <math>\text{CaF}_2</math> ground to 70 mesh through 200-mesh, with pulp for as frother. The results showed that the aeration increases up to about 25% solid in the pulp and then decreases very rapidly. With heavy pulp the distribution of air becomes extremely nonuniform. The most uniform distribution of air was observed in pulp consisting of 20-25% solid. The speed of rotation decreased with the increase of solid:liquid ratio. The max. rotation speed was observed with 20-25% solid in the pulp. The max. rotation speed corresponds to the optimum aeration index, i. e., the degree of aeration of the pulp with air and its uniformity. B. N. Goshal</p>	
<p>All-Union Sci. Res. Inst. Mineral Resources</p>	
<p>ASB-51A METALLURGICAL LITERATURE CLASSIFICATION</p>	
<p>FORM 10-51A</p>	<p>FORM 10-51A</p>



KLASSEN 4V-18

600

1. KLASSEN, V. I.

2. USSR (600)

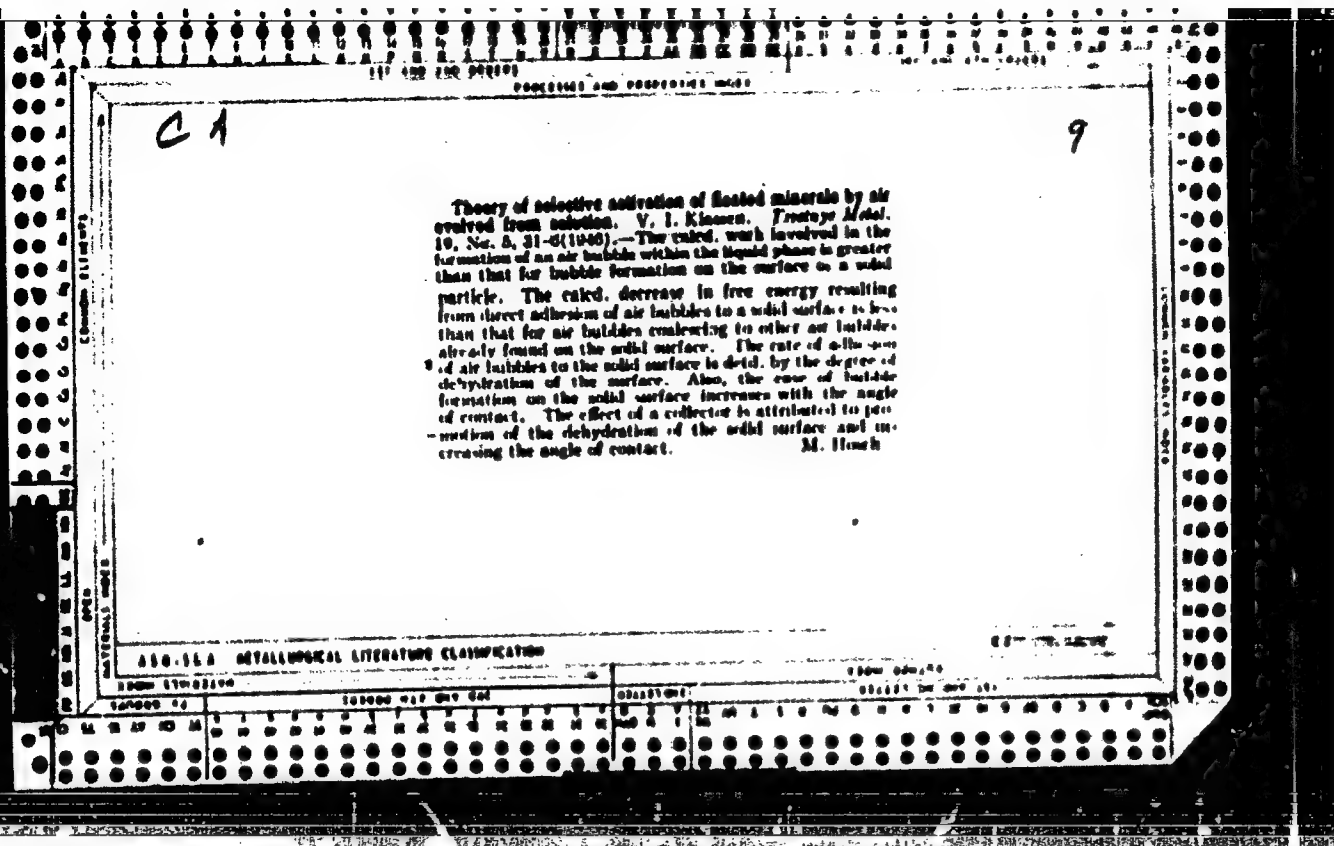
Vsegei (All-Union Institute of Geology) "A Method of Determining the Distribution of Air in a Flotation Machine", Tekhn. Met. 14, No 7, July 1939.

9. Report U-1506, 4 Oct 1951.

ea

Increasing the output of flotation machines by aeration.  
V. I. Kiselev. *Izvestiya Akad. Nauk. SSSR, No. 4/7, 30-41*  
(1941). *Chem. Zvest.* 1943, 1, 327. By equipping a  
mechanical flotation machine with an aeration apparatus (that  
divulges air was introduced into the flotation pulp), the  
latter, especially when of high d., was enriched. In the  
most part in the upper, most weakly aerated portion.  
This improved the aeration and accelerated the flotation  
(particularly of dense products) with slight deleterious  
effect on the end product (by contamination with entrained  
foam) and no change in the character of the foam. Plant  
tests with a flotation machine of new construction con-  
firmed these results and showed a capacity increase of  
31-41% with an increase in power required of 41%. De-  
tails of construction are given and suggestions for further  
improvement made. [see further]

[illegible]



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Causticite reaction. V. I. Klayen. USSR. 66.  
978, Dec. 31, 1917. Causticite is prep. by  
reducing the metal on the surface electrothermally in the  
presence of a heavy metal salt. 31. Hush

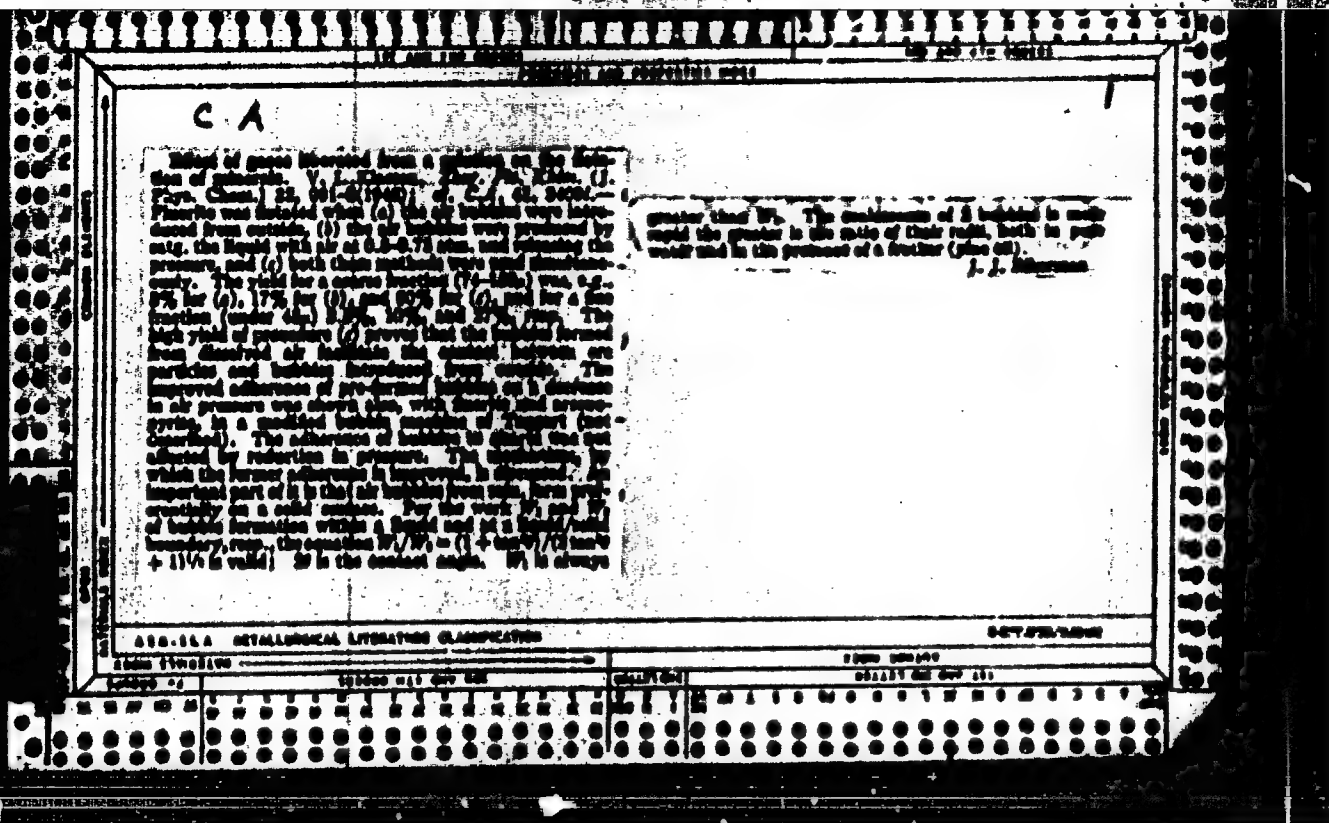
KLASSFN, V. I. Dr. Tech. Sci.

Dissertation: "Problems of the Theory of Aggration and Flotation." Moscow Inst. of Nonferrous Metals and Gold, imeni M. I. Kalinin, 21 Apr 47.

SO: Vechernyaya Moskva, Apr, 1947 (Project #17836)







		RESEARCH AND DEVELOPMENT	
		PROJECT AND REPORT NO.	
<i>ca</i>		7	
<p><b>Effect of gas adsorption on the floatability of minerals.</b> V. I. Klassen. <i>Gornyi Zhur.</i> 122, No. 9, 32-4(1948); <i>cf. CMI 45, 8g.</i>—The effect of phys. absorption of a gas (H<sub>2</sub>, air, CO<sub>2</sub>) on the floatability of fluorite and arsenopyrite was studied by passing the purified gas through a partition and then through the mineral (-100 + 20 mesh) at a rate of 100-8 bubbles/min. The mineral powder raised to the surface was collected and weighed. In the flotation of fluorite (200 g. NaOH/ton and varying amts. of citric acid) air was more active than H<sub>2</sub>. In both cases the pH re- mained const. (8.3). CO<sub>2</sub> lowered the quantity of fluo- rofloat; it also lowered the pH. Without collector, CO<sub>2</sub> gave somewhat higher results. In the flotation of arse- nopyrite (70 g. pine oil/ton and varying amts. of xanthate) CO<sub>2</sub> was more effective than either H<sub>2</sub> or air. In these expts. gas bubbles attached to mineral particles were in equil. with the gas dissolved in the soln.; also the ad- sorption of gases by the mineral particles was subsequent to the attachment of the collector to the particles. Gas bubbles attached themselves at points on the particle free of collector and to the hydrophobic apices outside ends of collector moils. This enhanced the hydrophobic action of the collector and lowered the kinetic energy of wetting by the aq. phase. In the absence of a collector, the hydration envelope on the mineral particle was com- plete and the bound H<sub>2</sub>O, devoid of its capacity to dissolve gas, hampered the penetration of the gas to the mineral surface. Collectors improve the floatability of minerals more than do gases. In flotation, the action of each is joined. M. Iliesch</p>			
ASD-SLA METALLURGICAL LITERATURE CLASSIFICATION			
SUBJECT SYMBOLS		CROSS INDEXING	
SYMBOLS NOT USED FOR		COLLECTOR'S USE ONLY	
TABLETS		PAGE	
A B C D E F G H I J K L M N O P Q R S T U V W X Y Z		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20	

KLASSEN, V. I.

PA 150757

Submitted by

USSR/Minerals - Flotation Process 21 Jul 49  
Test Techniques

"Evaluating the Flotation Activity of Mineral  
Surfaces," V. I. Klassen, L. D. Ratoryl'shaya,  
3 pp

"Dok Ak Nauk SSSR" Vol LXVII, No 3

Determined flotation activity of mineral  
powders by the following method: A bubble is  
fed from below to the horizontal surface of a  
layer of powder which is carefully pasted on a  
glass plate. Then the unit is slowly tilted at  
a constant rate until the bubble starts to

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USSR/Minerals - Flotation Process 21 Jul 49  
(Contd)

move from the spot. Knowing the displacement  
of the bubble and the inclination angle of the  
unit, the pull directed parallel to the surface  
of the powder layer may be calculated easily.  
Submitted by Acad P. A. Rebinder 17 May 49.

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9

Effect of flow films on flotation. V. I. Kharin. *Gornyi Zhur.* 124, No. 10, 21-4(1950). The presence of flow films in a flotation pulp causes a series of phys. and phys.-chem. phenomena which affect adversely the yield, quality of concentrate, and the time of flotation. The deleterious effect of flow films, particularly in the case of small particles, stems from the following properties: small mass of particles, large specific surface area, and small compression of and forces on the small surface. These 3 basic properties engender a series of phenomena which actually is considered affect flotation by this process. These properties of flow films are presented diagrammatically and are separately discussed. At least

USSR/Chemistry, (Colloid) - Flotation Dec 51

"Bubbles at Work," Dr Tech Sci V. I. Klassen

"Zhuk 1 Zhin" Vol XVIII, No 12, pp 25-27

Discusses theory of flotation on the basis of work done by A. N. Frumkin, P. A. Rebiner, et al, stating that investigations carried out by these scientists laid the groundwork for a correct understanding of the adherence of mineral particles to bubbles in flotation. Points out that bubbles form in flotation from dissolved air due to sharply reduced pressure during agitation, and that under the circumstances collision of a solid particle with an

20976

USSR/Chemistry (Colloid) - Flotation Dec 51  
(Contd)

air bubble is not always necessary in order to bring about adhesion. Says that hundreds of plants in which ores are enriched by flotation operate in the USSR, and that millions of tons of ore are being processed at these plants.

20976

KLASSEN, V. I., (Dr. Tech. Sci.)

Ussr/minerals - flotation, Processes 11 Aug 51

"Floatability of Mineral Grains of Various Coarseness in Respect to the Density of Flotation Suspension," V. I. Klassen, R. Z. Irenburg

"Dok Ak Nauk SSSR" Vol LXXIX, No 5, pp 855-857

Investigates possibility of regulating floatability of mineral particles by changing content of solid phase in suspension. Analysis of floatability of native sulfur, used in expts, reveals that floatability of coarse grains is improved with fine grains are better floating

210714

Ussr/minerals - flotation, Processes 11 Aug 51  
(Contd)

in suspensions of higher density. Presents results of investigation graphically. Submitted by Leon P. A. Reinder.

KLASSEN, V. I.

210714

KLASSEN, V.I.

USSR/Chemistry - Surface Active  
Agents

1 Jul 52

"The Mechanism of Milling Fine Quartz Grains in Ball Mills," V. I. Klassen, E. I. Popova, All-Union Sci Res Inst of Glass, Moscow

"Dok Ak Nauk SSSR" Vol LXXXV, No 1, pp 149-152

Dry milling of quartz sand is most effective when the mill contains only 20% of vol in balls. Wet milling, however, is most effective at 50%. Dry milling, at optimum conditions, proceeds in an intermittent manner. Addn of surface active agents (sulfate soap and soda) increases the rate of milling. Presented by Acad P. A. Rebinder 29 Apr 52.  
224722



KLASSEN, V.I., doktor tekhnicheskikh nauk; REBINDER, P.A., retsentsent,  
akademiik; MARGOLIN, I.Z., otvetstvennyy redaktor; ROMANOVA, L.A.,  
redaktor; ANDRIYEV, G.G., tekhnicheskii redaktor.

[Elements of the coal flotation theory] Elementy teorii flotatsii  
kamennykh uglei. Moskva, Ugletekhnizdat, 1953. 202 p. (MLRA 7:11)  
(Coal preparation) (Flotation)

KLASSEN, V.I.; MOKROUSOV, V.A.; FLAKSIN, I.N., retsentsent; TROITSKIY, A.V.,  
gornyi direktor, retsentsent.

[Introduction to the flotation theory] Vvedenie v teoriyu flotatsii.  
Moskva, Gos. nauchno-tekhn. izd-vo lit-ry po cherno i tsvetnoi  
metallurgii, 1953. 463 p. (MIRA 7:8)

1. Chlen-korrespondent AN SSSR (for Flaksin)  
(Flotation)

KLASSEN, V.I.

✓ 1971. CONFERENCE ON FLOTATION OF COAL FINES. Klassen, V.I. (Vestn. Akad. Nauk SSSR (J. Acad. Sci. U.S.S.R.), Nov. 1953 176-180). A conference held jointly by the Institute of Mining Academy of Sciences U.S.S.R. and other organizations in June 1953 is summarized.

**KLASSEN, V.I.**

Conference on coal enrichment by flotation. Izv. AN SSSR Otd. tekhn. nauk no. 10:  
1495-1498 O '53.

(KLSA 6:11)  
(Coal preparation)

KLASSEN, V.I.

Flotation of large hydroboracite grains. V. I. Klassen and L. D. Ratobyl'skaya. *Akim. Prom.* 1966, 1966. Previously developed flotation procedure permitted good sepn. of fine particles of hydroboracite from the gang, but the coarse particles remained with the gang. The use of turpentine or emulsified nonpolar reagents (kerosene) resulted in high concn. of  $H_2O_2$  in the product and a high extn. The effect of these addns. is attributed to their selective fixation upon the mols. of the hydroboracite which increases the hydrophobic properties of the hydroboracite surface, and fastens it more securely to the bubble surface. W. M. S.

USSR/Mining

Card 1/1 : Pub. 41-5/18

Author : Klassen, V. I., and Plaksin, I. N., Corresponding Member, Academy of Sciences, USSR

Title : The mechanism of action of certain reagents and of pulp aeration in coal flotation

Periodical : Izv. AN SSSR. Otd. tekhn. nauk 3, 62-71, March 1954

Abstract : Presents results of investigation into mechanism of action of nonpolar reagents, inorganic salts, and pulp aeration during flotation of coal. Graphs, table. Sixteen references

Institution :

Submitted : March 9, 1954

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The mechanism of the action of nonpolar reagents on the flotation of coal. V. I. Klassen and I. N. Maksin. *Doklady Akad. Nauk SSSR* 99: 563-5 (1954); cf. C.A. 49, 4907y. —Nonpolar reagents have been widely used as collectors in the concentration of coal and other ores. These reagents considerably increase the upper limit of floatable grain size. The reason for this, until now, had been established only to a first approximation. K. and P. had assumed that such an action might be connected with the formation of "strings" of reagent around the three-phase adhesion boundary. The interaction of kerosene and decalin with grains of coal was studied. The grains were colored with a red nonpolar dye. The grains were then treated with the reagents. The results of the experiments are given. It was found that: (1) Decalin is unsuitable both the kerosene and the decalin are attached to the coal surface. (2) Nonpolar reagents readily formed stable finely dispersed emulsions in water. (3) If coal grains float on the surface of water in which emulsified nonpolar reagent is present, a border of nonpolar reagent forms immediately along the three-phase wetting boundary. This border is more intensely colored along the surface of the grains. (4) If a group of adjacent particles of coal are floating on the water surface, the part of the water surface between them is lightened by a film of kerosene, and the color of the film is more intense in the vicinity of the three-phase contact. Three colored photomicrographs appear with the report. —Ondrej S. Mary



KLASSEN, Villi Ivanovich, doktor tekhnicheskikh nauk; AVSEYENOK, A.F.,  
redaktor; ALADOVA, Ye.I., tekhnicheskii redaktor

[Coal flotation] Flotatsiia uglei. Moskva, Ugletekhizdat, 1955.  
25 p. (MIRA 9:1)

(Coal preparation)

USSR?

Calculation of the vertical motion of mineral particles in a liquid. H. V. Miller and V. I. Khazen. *Gornyi Zhurnal*, 1958, No. 5, 53-57. The general equation for the velocity (v) of flow of a liquid at which it will support a mineral grain of a layer of grains is  $\frac{1}{2} \rho_l v^2 (P - P_0 - P_1) \frac{A}{A_0} = (P - P_0 - P_1) \frac{A}{A_0} H g$ , where  $\rho_l$  and  $\rho_s$  are sp. gr. of mineral and liquid, resp.,  $A$  is cross section of stream of liquid,  $A_0$  cross section of mineral particle perpendicular to flow of liquid,  $P$  area of liquid having a velocity less than the av. velocity at the level of the mineral grain,  $H$  height of mineral particle, and  $g$  gravity. For large grains the simplified form of this equation is  $\frac{1}{2} \rho_l v^2 \frac{A}{A_0} (P - P_0 - P_1) = (P - P_0 - P_1) H g$ . M. Hosh...

KLASSEN, V. I.

Review of work on coal detection, and his future schedule  
and industrial developments. V. I. Klassen and L. N.  
Pavlov. *Int. J. Coal. Geol.* 1968, No. 11, 101-110. — General discussion, with specific  
reference to Russian conditions. W. J. Saragov.

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KLASSEN, V.I.

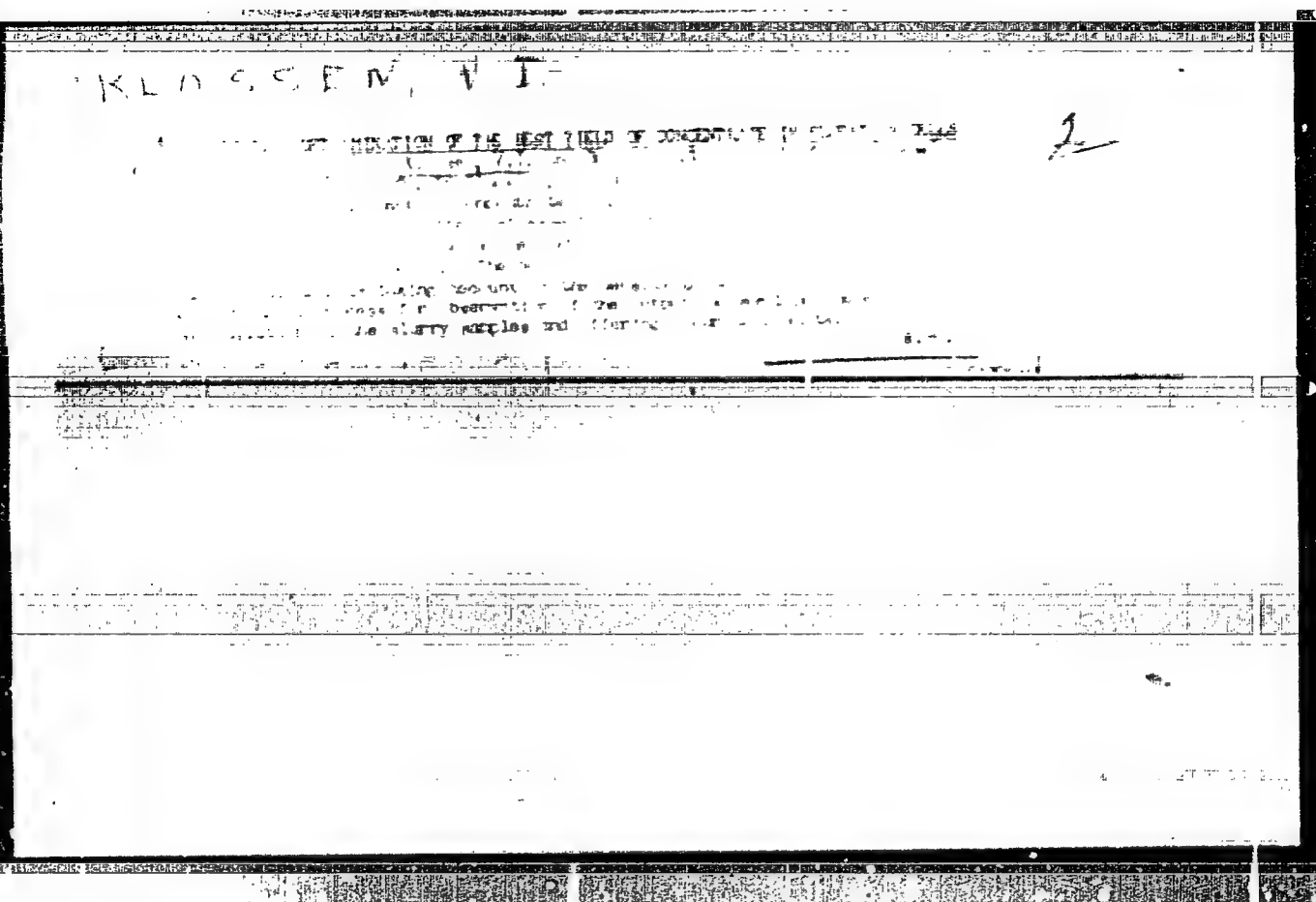
170. EFFECT OF STRUCTURE AND COMPOSITION OF REAGENTS ON THEIR ACTION IN THE FLOTATION OF COALS. Klassen, V.I. and Flaksin, I.M. (Dokl. Akad. Nauk SSSR (Rep. Acad. Sci. U.S.S.R.), 17 Aug. 1955, vol. 103, (5), 679-681). Experiments on a coal with many fine mineral impurities and much surface oxidation from the Pashkovskaya mine in Donbass gave good results with paraffins with a polar (hydroxyl or carbonyl) group and 6 to 8 carbon atoms, and with aromatic hydrocarbons having a polar and a sulfo- group. The polar group is best placed in the meta- position. The general conclusion is that by selecting the flotation agent for a particular coal the consumption of the agent can be reduced to 20 to 150 g per ton of coal. (L).

KLASSEN V.I.

12) the effect of the composition and structure of the medium on their flotation curves;

activity is increased by about 10%.

DM



*Klassen, V.I.*

124-1957-10-11793

Translation from: Referativnyy zhurnal, Mekhanika, 1957, Nr 10, p 87 (USSR)

AUTHORS: Plaksin, I. N., Klassen, V. I., Nesterov, I. M., Miller, E. V.

TITLE: Resistance of a Layer of Mineral Grains to a Liquid Stream  
Passing Through It (O soprotivlenii sloya mineral'nykh zeren  
prokhodyashchemu potoku zhidkosti)

PERIODICAL: Tr. In-ta gorn. dela AN SSSR, 1956, Vol 3, pp 213-238

ABSTRACT: To compute the resistance of a liquid flow through a layer of mineral grains, the Navier-Stokes equation for laminar flow through channels with varied cross sections is solved. Shapes of cross sections similar to those prevailing between adjacent grains are discussed. The flow equation is solved by a method of finite differences. For an average velocity  $v$  the following equation is given:

$$v = -\alpha \frac{r_0^2}{\mu} \frac{dp}{dz} \quad (1)$$

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124-1957-10-11793

# Resistance of a Layer of Mineral Grains (cont.)

where  $x_0$  is the radius of a circle having an area equal to the cross section of the channel;  $dp/dz$  is the pressure gradient;  $\mu$  is the viscosity;  $\alpha$  is a coefficient depending upon the shape of the cross section which is equal to 0.125 for a round section, 0.14 for a square or triangular section, etc. On the average  $\alpha$  is assumed to be 0.13. An average velocity through a layer containing a large amount of grains is computed. The pressure drop across the layer is determined by the equation:

$$\left| \frac{dp}{dz} \right| = \frac{189.4 \mu v_1 (1-\theta) \theta^{\frac{1}{2}}}{(d_1^2 + d_1 d_2 + d_2^2) (1 - \theta^{\frac{2}{3}})^4 g} \quad (2)$$

where  $\theta$  is the compactness of the layer and  $d_1$  and  $d_2$  are the dimensions of the largest grain and the smallest grain in cm. A formula for the computation of the velocity in poured and compacted particles (grains) was obtained. The formulas were tested by experiments. The experiments carried out with magnetite

Card 2/3



124-1957-10-11793

**Resistance of a Layer of Mineral Grains (cont.)**

(size 0.2 - 0.1 cm) lead glance (0.16 - 0.1 and 0.0147 - 0.0104), and chalcoprytes (0.042 - 0.025), showed that formula (2) can be used for velocities  $v_j < 1$  cm sec<sup>-1</sup>. An analysis of results obtained shows that the formulae cannot be used without giving them a further, more accurate definition in the case of a low degree of grain compactness. Bibliography: 6 references.  
Ye. M. Minskiy

Card 3/3

PLAKSIN, I.M.; KLASSEN, V.I.; NESTEROV, I.M.; MILLER, E.V.

Water movement in a sinusoidal settling cycle; quality evaluation.  
Trudy Inst.gor.dela 3:247-254 '56. (MLA 9:8)  
(Ore dressing)



111 AKSEN, U. L.

222. ELECTRO-MAGNETIC METHOD OF INDICATING THE MOVEMENT OF PARTICLES DURING GRAVITY SEPARATION. K. K. Kozlov, V. M. Gerasimov, K. I. Gorn. Zh. Khim. J. Moscow, Apr. 1958, 22-23. The method described is based on changes in the inductivity of a coil placed in the water of cells during the replacement of it of a magnetic field. The method differs from others previously used in that it does not require the use of a microscope. Information in the system under examination is obtained with a high degree of accuracy. Evaluation of the speed, time writing, with the use of a vertical scale, a record of curved particles in a cell of a column and the time short-circuits of the. Mathematical analysis of the data on the rate variable factors on the characteristic of movement of particles may prove very helpful in studying the fundamentals of a theory of movement of particles during gravity separation processes. N.C.S.

Don. te Dornago della 4N 15°K

KOCHANOVA, KLASSEN, U.S.

*Encl* ✓ The interaction of polar flotation agents with coals. V. I. Klassen and L. A. Kochanova. *Izv. Akad. Nauk S.S.S.R., Otdel. Khim. Nauk* 1956, No. 7, 121-3. The electrokinetic potential measurement method was selected for the study of the flotation agent fixation because of the difficulties connected with use of taget stones and of the chem. investigation methods (adsorption on the total surface, including the pore surface, and difficulties in getting a wide assessment of heterop.). The electrokinetic (1) potential measurement on the coal-water interface involved the compression of powdered coal for the dispersion prep. The results were well reproducible. The  $\zeta$  potential of various concns. of EtOH, BuOH, hexanol, octanol, and PhOH have opposite signs in contact with the coal and the gang. The PhOH adsorption on the coal and gang was detd. iodimetrically or colorimetrically. A min.  $\zeta$  potential is produced at definite alc. concn., and the max. collector (hydrophobizing) effect is produced at that min. The results confirm the earlier results of Klassen and Plakšin (C.A. 49, 9106) in which alc. was found among the most selective coal fixation reagents. With optimum octanol concn. of 285 g./ton of coal, the  $\zeta$  potential of coal is 3.2 mv., and of the gang is 14 mv. The hydroxyl group is not essential. It is important that the polarity be caused by an asym. reagent structure, and that no carbonyl, S, or similar groups be present. W. M. Steenberg

KLASSEN, V.I., doktor tekhnicheskikh nauk.

Apropos of V.D.Ponomarev's article "Energy of attachment of a mineral particle to an air bubble." Vest.AN Kazakh.SSR 12 no.10: 87-89 0 '56. (MLRA 9:12)  
(Flotation) (Ponomarev, V.D.)

PLAKSIN, I.N.; KLASSIN, V.I.; BERONER, O.S.

Kinetic equations for the flotation process. *Tsvet.net.* 29 no.4:  
20-24 Ap '56. (MLRA 9:8)

(Flotation)

KLASSEN, V.I., professor, doktor; PIKAT-ORDYNSKIY, G.A.; GUREVICH, R.I.

Increasing flotation efficiency by means of foam sprinkling. Tsvet.  
met. 29 no.5:12-16 My '56. (MLRA 9:8)

1. Moskovskiy gornyy institut.  
(Flotation)



KLASSIK, V.I.; BERGER, O.S.; MOOILEVSKIY, I.A.

Method of increasing the precision of laboratory flotation tests.  
TSvet.net. 29 no.9:79-80 8 '56. (MIRA 9:10)  
(Flotation)

KLASSEN, V.I., professor, doktor tekhnicheskikh nauk; BERGER, G.S., inzhener.

Determining the better concentrate recovery in the cells of the coal flotation machine. Ugel' 31 no.1:33-38 Ja '56. (MLRA 9:4)

1.Institut gornogo dela AN SSSR (for Klassen).2.Karagandinskaya TsOP (for Berger).

(Coal preparation) (Flotation)

KLASSEN, V. I.

U.S. AIR FORCE, June 25, 1957

M. Hensch

MT

SOV/137-58-7-14020

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 7, p 5 (USSR)

AUTHOR: Klassen, V. I.

TITLE: Gravitational Concentration of Minerals (Gravitatsionnoye obogashcheniye poleznykh iskopayemykh)

PERIODICAL: V sb.: Sov. gorn. nauka. 1917-1957. Moscow, Ugletekhizdat, 1957, pp 581-604

ABSTRACT: A review is presented of the theory of pulsation jigging, of heavy-suspension concentration and of other gravitational processes as employed in the USSR. Bibliography: 59 references.

1. Minerals--Processing 2. Minerals--Theory I. M.

Card 1/1

KLASSEN, V. I.

68-1-5/21

**AUTHOR:** Klassen, V.I., Doctor of Technical Sciences, Professor,  
and Pikkat-Ordynskiy, G.A., Engineer.

**TITLE:** An Improvement in the Flotation of Coals by Spraying of  
Foam. (Uluchsheniye Flotatsii uglia primeneniym oroshen-  
iya peny.)

**PERIODICAL:** Koks i Khimiya, 1957, No.1, pp. 15 - 19 (USSR)

**ABSTRACT:** The process of secondary concentration which takes place  
in the foam layer was investigated in the flotation laboratory  
of the Moscow Mining Institute directed by Prof. I.M. Verkhov-  
skiy. Changes in the ash content with the depth of foam during  
flotation of coal on the Karagandinsk TsOF are shown in Fig.1.  
Experimental investigations indicated that the secondary con-  
centration which takes place in foam depends to a large extent  
on the structure and stability of foam and on the thickness of  
water layers separating foam bubbles and the velocity of drain-  
ing of this water. It was established that an artificial in-  
crease of the thickness of inter-bubble water and the velocity  
of its draining gives a positive effect. This was done by  
spraying the foam. Optimum condition of spraying: water con-  
sumption 6 l/min per  $\Phi$ M-2.5 machine; height of spraying  
installation 200 mm over the foam surface. With higher water  
consumption or excessive height of spray the destruction of  
foam takes place. Spraying of foam during flotation (Fig.2)

Card 1/2

AUTHOR: Klassen, V. I. (Moscow).

24-5-22/25

TITLE: Flotation with fatty acids at lowered pulp temperatures.  
(Flotatsiya zhirnymi kislotalami pri ponizhennykh temperaturakh pul'py).

PERIODICAL: "Izvestiya Akademii Nauk, Otdeleniye Tekhnicheskikh Nauk"  
(Bulletin of the Ac.Sc., Technical Sciences Section),  
1957, No.5, pp.136-138. (U.S.S.R.)

ABSTRACT: One of the fundamental defects of chemical collection reagents, used particularly for concentration of precious metals, is the fact that their activity decreases sharply with decreasing temperatures and this makes it necessary to heat huge volumes of water during a considerable part of the year involving appreciable costs. The authors developed a method of preparing fatty acids for flotation which almost entirely eliminates the here mentioned drawback. As a collection reagent oleic acid was used for flotation of ores containing useful polar minerals, the flotation of which is usually effected whilst heating the pulp to about 20 C. The best results are obtained by feeding the oleic acid gradually into a hot alkaline solution in presence of a small quantity of pine oil with simultaneous intensive stirring and then feeding the obtained mixture in the hot

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APPROVED FOR RELEASE: 06/19/2000

CIA-RDP86-00513R000723010001-7

state into the cold pulp. By using oleic acid, "destructured" according to the method described in the paper, the high degree of concentration ability is maintained for temperatures as low as 5 to 6 C and thereby the fundamental drawback of beneficiation by fatty acid type collector agents is eliminated. The same method can also be applied for other types of collecting reagents.

There are 3 figures, 6 references, 5 of which are Slavic.

SUBMITTED: July 2, 1956.

ASSOCIATION: Institute of Minin, Ac.Sc. (U.S.S.R.)  
(Institut Gornogo dela AN SSSR).

Card 2/2

137-58-6-11343

**Irrigation of the Froth (cont.)**

in the froth, and 3) the washing off of the slimes. Irrigation of the froth is most effective when mineralization is high and in repeat operations the number of which may thus be reduced. Shop tests at the Lyangar Molybdenum and Tungsten Plant showed irrigation to result in a 100 to 150% increase in degree of concentration. Tables are adduced for the effect of the flow of irrigation water on the results and the size of the grains extracted in the froth in flotation of Lyangar ore. Possible variants of irrigating devices are described.

L.B.

1. Ores--Processing    2. Ores--Flotation    3. Industrial plants--Equipment

Card 2/2

KLASSEN, V. I.

68-7-2/16

**AUTHORS:** Publikov, A.V., Klassen, V.I., Zhendrin'skiy, A.P. and Kopychev, P.A.

**TITLE:** Pneumatic Flotation Machines. (Pnevmaticheskiye flotatsionnyye mashiny).

**PERIODICAL:** Koks i Khimiya, 1957, Nr 7, pp. 6-9 (USSR).

**ABSTRACT:** The development and testing of a pneumatic flotation machine for the flotation of coal slurries is described. In 1955 the collective of the Dneprodzerzhinsk Works in cooperation with the Dnepropetrovsk Mining Institute and the Mining Institute of the Academy of Science of the USSR designed and built a pneumatic flotation machine (a description and a diagram are given, Fig.1) which was tested on a flotation plant (Fig.2). The experimental results for the pneumatic machine are given in Table 1 and parallel results for a normal impeller machine in Table 2; a comparison of power consumption by the above two machines is given in Table 3. During testing, a number of design deficiencies were observed and a new machine was designed (shown in Fig.3). On the suggestion of V.I.Klassen, spraying of foam was included (spraying arrangement is shown in Fig.4). In 1956 three of these machines were built and included into the flotation train (Fig.5). Tests were carried out

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1/3

2/3

68-7-2/16

Pneumatic Flotation Machines.

There are 7 tables and 5 figures.

**ASSOCIATIONS:** Dneprodzerzhinsk Coke Oven Works (Dneprodzerzhinskiy Koksokhimicheskiy Zavod), IGD AN SSSR, and Dnepropetrovsk Mining Institute (Dnepropetrovskiy Gornyy Institut).

**AVAILABLE:** Library of Congress

Card  
3/3



AUTHORS: Klassen, V. I., and Starchik, L. P.

20-6-21/48

TITLE: On the Mechanism Underlying the Action of Reagents During Flotation  
(K mekhanizmu deystviya reagentov pri flotatsii).

PERIODICAL: Doklady AN SSSR, 1957, Vol. 115, Nr 6, pp. 1129-1130 (USSR.).

ABSTRACT: Already, in the early works dealing with the flotation theory the attention had been drawn to the extremely great importance of the linear zone of the three-phase contact. It is exactly here that the explanation of the molecular-mechanism of the action of reagents on the adherence of the mineral grains to the air bubbles shall be sought (Rebinder). The collecting reagents mainly adhere along the three-phase boundary surface (supposition by Ostwald). Especially capable of this are those reagents whose molecules have a "triphilic" structure, i. e. groups possessing a relation with the mineral, the water and the air (accordingly). Various suppositions uttered were never experimentally proved, especially in the application of foam-flotation. In the case of the confirmation of an increased concentration in the three-phase contact-zone, however, it would be possible to determine the mechanism of the anchorage of the mineral grains in the bubbles in many respects, and to explain the causes of the molecular wetting hysteresis as well as the possibilities of a flotation

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20-6-21/48

*On the Mechanism Underlying the Action of Reagents During Flotation.*

in extremely small concentrations of reagents. From this becomes evident the positive part played by the problem posed here in the development of the flotation theory and consequently in the relevant practice. That part of the hypothesis which concerns the behaviour of the reagents little soluble in water was confirmed by the authors and Plaksin. In the case of an insufficient hydrophobis of the surface of minerals the droplets of such reagents at once extend, as an uninterrupted thread along the three-phase contact. This quite substantially consolidates the anchorage of grains in the bubbles. The presence of such reagents considerably increases the upper size-limit of the grains of bituminous coal and sulphur (native) and of similar minerals which in flotations are converted to the foam product. The tests performed here made it possible to verify an increased concentration in the three-phase contact zone and in the zone of the chief collecting reagents whose molecules have a heteropolar structure. As an example of these potassium-ethylxanthogenate with the radioactive sulfur isotope  $^{35}\text{S}$  was selected, as a mineral, however, - galena. On the basis of these tests it may be stated that the molecule concentration of the collector-reagents in comparison with the other surface sections of the mineral in the three-phase contact zone is increased. This shall be taken into account in further investigations in the field of the flotation theory.

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On the Mechanism Underlying the Action of Reagents During Flotation. 20-6-21/48

There are 2 figures and 4 Slavic references.

ASSOCIATION: Institute for Mining AN USSR (Institut gornogo dela Akademii nauk SSSR.).

PRESENTED: By P. A. Rebinder, Academician, March 25, 1957

SUBMITTED: March 14, 1957.

AVAILABLE: Library of Congress.

Card 3/3

KLASSEN, V. I. Professor (IOD AN SSSR)

"The vacuum flotation of particles smaller than  $10 \mu$  "

report presented at the 4th Scientific and Technical Session of the Mekhanobr  
Inst, Leningrad, 15-18 July 1958

KLASSEN-NEKLUDOVA, M. V., INDINBOM V. L., URUSOVSKAYA, A. A. and TOMILOVSKIY, G.E.

"Comparison of Deformed Crystals with Etch-Pattern Distribution,"

paper presented at the Conf. on Mechanical Properties of Non-Metallic Solids,  
Leningrad, USSR, 19-26 May 58.

Institute of Crystallography of the Acad. Sci. of USSR, Moscow

KLASSEN, V. I., PLAKSIN, I. N., AKOPOV, M. G.

"The Effect of Reagents on the Treatment of Small Coal in Hydrocyclones,"  
(Section D)

paper submitted for Third Intl. Coal Production Congress, Leige, Belgium, 23-28  
June 1958.

KLASSEN, V. I., PLAKSIN, I. N., and VLASOVA, N. S.

"Theoretical Bases of the Action of Reagents in the Flotation of Coal,"  
(Section E).

paper submitted for Third Intl. Coal Production Congress, Leige, Belgium, 23-28  
June 1958.

68-58-3-4/22

AUTHORS: Klaassen, V.I. Doctor of Technical Sciences and  
NEVSKAYA, E.A.

TITLE: Flotation of Coals with a High Proportion of Clay Slurries  
(Flotatsiya ugley pri bol'shom kolichestve glinistyykh  
shlamov)

PERIODICAL: Koks i Khimiya, 1958, Nr 3, pp 15 - 18 (USSR).

ABSTRACT: The presence of fine clay slurries presents one of the most serious difficulties in flotation of coal fines. In order to improve flotation under such conditions, additions of reagents causing peptisation of clays is necessary. The authors investigated the applicability for this purpose of alcohols with aliphatic radicals consisting of 6-8 hydrocarbon groups so called "distillation residues" and reagent IM-6-8. "Distillation residues" - high boiling fraction left on the distillation of raw sulphate-turpentine (which is a waste product of the Segezhskiy bumazhno-tsellyuloznyy kombinat (Segezha Paper-cellulose Combine) ) containing 47% of alcohols (calculated on  $C_{10}H_{17}OH$ ). The reagent IM-6-8 consists of alcohols with 6-8 hydrocarbon groups in the radical. The experimental results are given in Tables 1-3 and Figs. 1-5. The flotation scheme is shown in Fig. 6. Conclusions: Reagents of the above type were found to be suitable for the flotation

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68-58-3-4/22

Flotation of Coals with a High Proportion of Clay Slurries

of clay containing coals. These reagents act not only as frothing and collecting agents but also preferentially peptise clay slurries. Simple conditions for the flotation of clay containing Karaganda coal were developed which yield good beneficiation results while previously this coal could not be beneficiated by flotation. It was confirmed that the best results are obtained with a combination of alcohols with non-polar reagents. In the role of the latter, the best results were obtained with a "polymer" proposed by VUKhIN; similar results were obtained with sulphated kerosene. An industrial check confirmed the laboratory results; the use of the proposed reagents on the Karaganda washeries sharply improved flotation results. It was also confirmed that spraying of froth with water considerably improves the efficiency of flotation of coals. There are 3 tables, 6 figures and 7 Soviet references.

ASSOCIATION: Institut gornogo dela AN SSSR (Mining Institute of the  
Card 2/2      Ac.Sc. USSR)

**AUTHORS:** Klassen, V. I., Doctor of Technical Sciences, 64-58-3-6/20  
Erenburg, R. Z., Candidate of Technical Sciences

**TITLE:** On the Use of Regulator Reagents in the Flotation of Natural Sulfur Ores (O primeneni reagentov-regulyatorov pri flotatsii samorodnykh sernykh rud)

**PERIODICAL:** Khimicheskaya Promyshlennost', 1958, Nr 3, pp 24-27 (USSR)

**ABSTRACT:** Investigations were made of the influence of sodium pyrophosphate and soda with water glass on the flotation of the principal minerals of natural sulfur, as these reagents had already been proposed by some authors, the latter by L. I. Stremovskiy. K. F. Beloglazov and N. V. Zashikhina (Leningrad Mining Institute) had already observed that by saponine, tanin, and ferric hydroxides the flotation properties of natural sulfur are decreased, whereas the sodium salts of phosphoric acid and soda with water glass do not render the sulfur surface hydrophile, and on the other hand the finely dispersed mud which usually deteriorates the flotation selectivity is peptized and thus the flotation is improved. The present investigations were made according to the method of "tangential repulsion of small bubbles". Together with that a quantitative

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On the Use of Regulator Reagents in the Flotation of Natural  
Sulfur Ores

64-58-3-6/20

determination of the adhering sodium silicates and of the sodium pyrophosphate was made at the surface of the mineral grains. The mentioned experimental results show that the mixture of soda and water glass has a strong hydrophilic effect on the surface of the vein minerals, whereas sodium pyrophosphate strongly decreases the adherence of small air bubbles at the mineral surface, with the exception of sulfur which is only rendered hydrophile by great additional quantities (10-15 kg per ton). By means of the reagents mentioned above the loss in sulfur can be decreased from 4.5% to 1.5%, and the yield of the concentrates can be increased from 79% to 94%. In this connection sodium pyrophosphate has a stronger selective restraining effect on the vein minerals and shows good results according to a flotation scheme with 3 kg per ton. There are 6 figures, 3 tables.

1. Sulfur ores--Processing 2. Minerals--Flotation 3. Reagents  
--Performance 4. Flotation--Test results

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KLASSEN, V.I., doktor tekhn. nauk; NIKENBURG, E.Z., kand. tekhn. nauk.

Use of controllers in the flotation of native sulfur ores. Khim.  
prom. no.3:152-155 Ap-May '58. (MIRA 11:6)  
(Sulfur) (Flotation)

AUTHORS: Akopov, M.G., Venkova, M.D., Klassen, V.I. and  
Plaksin, I.N. (Moscow) SOV/24-58-4-26/39

TITLE: On the Theory of Beneficiation of Coal Fines in  
Hydrocyclones (K teorii obogashcheniya melkogo uglya  
v gidrotsiklonakh)

PERIODICAL: Izvestiya Akademii Nauk SSSR, Otdeleniye Tekhnicheskikh  
Nauk, 1958, Nr 4, pp 129-132 (USSR)

ABSTRACT: One of the problems of coal beneficiation is to find a  
simple and efficient method of beneficiation of small  
fractions. At present two processes are applied for  
this purpose: settling of grains larger than 0.6 mm  
and flotation of grains smaller than 0.6 mm. Although  
the settling of such small grains is fully possible,  
the process is not sufficiently productive. In the  
Institut Gornogo Dela, AN SSSR (Institute of Mining,  
Ac. Sc., USSR) a method of beneficiation in hydrocyclones  
was developed. The beneficiation of coal is effected  
in water to which hydrophobous reagents are added.  
The presence of reagents brings about an appreciable  
increase in the effectiveness of the beneficiation  
process since it results in a more thorough separation

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SOV/24-58-4-26/39

On the Theory of Beneficiation of Coal Fines in Hydrocyclones

of the coal particles from the ash particles. The fact that reagents are necessary is attributed to the high content of dissolved gases in the liquid phase of the suspension; in the hydrocyclone the pressure drops sharply and, according to the law of Henry, the pressure drop should result in a rejection from the solution of a large quantity of gases. The rejection of the gases from the solution takes place predominantly at the surface of the solid particles and it is the more intensive the more hydrophobous the surface of the particles. This is particularly noticeable in the flotation of hard coal with addition of large quantities of hydrophobous reagents. In the space subjected to the effects of the centrifugal force in the hydrocyclone, where the influence of differences in the mass of the grains on the separation speed increases very considerably, the presence of gas bubbles of even microscopic dimensions is of great importance from the point of view of separating particles of coal from particles of ash. To verify this idea, the authors

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SOV/24-58-4-26/39  
On the Theory of Beneficiation of Coal Fines in Hydrocyclones

carried out experiments to establish experimentally the existence of a separation of gases from the solution in the hydrocyclone. The experiments were carried out inside a perspex hydrocyclone of 80 mm dia., a schematic sketch of which is reproduced in Fig 1. From the sump 1 water, under an excess pressure of 1.2 atm, was fed into the hydrocyclone 3 by means of a centrifugal pump 2. The gas content at various points was determined by measuring the oxygen concentration at the respective points by means of an electro-chemical method described in earlier work of one of the authors (Ref 2). The experimental results relating to the rejection of the dissolved air from the water in various zones of the hydrocyclone prove that gases rejected from the solution play an important role in the beneficiation of coal in the case of applying reagents. Rejection of dissolved gases occurs almost throughout the entire volume of the liquid and, particularly, in the central zone where the coal beneficiation is mainly concentrated. The results provide an indirect proof of the views of the authors relating to the

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SOV/24-58-4-26/39

.On the Theory of Beneficiation of Coal Fines in Hydrocyclones  
mechanism of the effects of reagents.  
There are 4 figures and 7 Soviet references.

SUBMITTED: January 2, 1958

Card 4/4



KLASSEN, V.I., prof., doktor tekhn.nauk; KOVACHEN, K.P., inzh.

Effect of soluble salts contained in coals on the coal floatability. Nauch.dokl.vys.shkoly; gor.delo. no.4:241-245 '58.  
(MIRA 12:1)

1. Predstavleno kafedroy obogashcheniya poleznykh iskopayemykh Moskovskogo gornogo instituta imeni I.V. Stalina.  
(Coal preparation) (Flotation)

**KLASSEN, V.I.; VLASOVA, N.S.**

New agents for the flotation of coal. Biul.tekh.-ekon.inform.  
no.9:6-7 '58. (MIRA 11:10)  
(Flotation) (Coal preparation)

SOV/24-58-10-18/34

**AUTHORS:** Klassen, V. I., Yagodkina, T. K. (Moscow)

**TITLE:** Peculiarities in the Flotation Properties of Pyrite and Marcasite from Coal Deposits (Osobennosti flotatsionnykh svoystv pirita i markazita ugol'nykh mestorozhdeniy)

**PERIODICAL:** Izvestiya Akademii nauk SSSR, Otdeleniye tekhnicheskikh nauk, 1958, Nr 10, pp 110-114 (USSR)

**ABSTRACT:** The authors point out that many reagents effective in the flotation of ore pyrite fail to produce appreciable desulphurization when coals are being flotated. They describe their experiments carried out to elucidate the reasons for this and study the differences in the properties of pyrite and marcasite of coal and ore origin. Chemical, mineralogical and X-ray analyses showed (table) that the coal minerals contained appreciable quantities of bitumens and more sulphate sulphur and that it was more porous. The authors consider that the presence of organic materials during the formation of the minerals must have affected the flotation properties of the sulphides. The reactions of the minerals with ethyl xanthate and lime was studied with the aid of radioactive

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SOV/24-58-10-18/34

# Peculiarities in the Flotation Properties of Pyrite and Marcasite from Coal Deposits

tracers ( $S^{35}$  and  $Ca^{45}$ ) using previously-described techniques (Refs 8 and 9). This work showed that coal pyrite and marcasite absorb more xanthate than does ore pyrite: the curves of absorption (and also recovery) against xanthate consumption are shown in Fig 1 for the various materials. The effectiveness of the reagent, however, was less with the coal minerals, indicating that the absorption was not of the appropriate type, and radiographic prints (Fig 2) show that the distribution of the reagent in the particle surfaces was most uneven. The authors found that calcium-ion absorption by the coal pyrite and marcasite is less than by ore pyrite for lime consumptions of under 5 kg/ton but rises rapidly above this. Fig 3 shows the calcium ion absorptions (mg/g) as functions of lime consumption and contact time in minutes (left and right-hand graphs, respectively) for the various test materials. Although the coal pyrite and marcasite absorb more xanthate in the presence of lime than does ore pyrite (left-hand graph, Fig 4), the lime has practically no effect on their flotation (right-hand graph, Fig 4). Those reagents which act as collectors for coal were found to act similarly for coal pyrite and marcasite (Fig 5) and the authors draw

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SOV/24-58-10-18/34

**Peculiarities in the Flotation Properties of Pyrite and Marcasite  
from Coal Deposits**

attention to the need for using the appropriate reagents for coal desulphurization by flotation. V. I. Tyurnikova advised on this work. There are 5 figures, 1 table and 15 references; 10 of the references are Soviet and 5 English.

**ASSOCIATION:** Institut gornogo dela AN SSSR, Moskovskiy gornyy institut  
(Mining Institute of the Academy of Sciences, USSR, Moscow  
Mining Institute)

**SUBMITTED:** March 3, 1958.

Card 3/3

*KLASSEN, V. I.*

COUNTRY : Bulgaria H-22  
 CATEGORY :  
 AB3. JOUR. : RZKhim., No. 16 1959, No. 58378  
 AUTHOR : *KLASSEN, V. I. and Kovachev, K. P.*  
 INST. : Not given  
 TITLE : Investigation of the Effect of Soluble Salts  
 Present in Coals from the Balkan Coal Basin on  
 the Flottability of the Coals  
 ORIG. PUB. : Minno Delo, 13, No 5, 9-16 (1958)  
 ABSTRACT : The coals in the Balkan Coal Basin contain con-  
 siderable quantities of water-soluble salts,  
 chiefly gypsum. When the coals are wetted, these  
 salts pass into solution and by their electro-  
 chemical action markedly improve the flottabil-  
 ity of the coals. Tests of the established op-  
 timum conditions for the contacting of the coals  
 with water prior to flotation under pilot plant  
 conditions are recommended.

D. Tsikarev

CARD: 1/1

KLASSEN, V.I.; GUREVICH, R.I.; BERLINSKIY, Sh.I.; KORNYEV, A.F.

Flotation with use of oleic acid at low pulp temperatures. TSvet,  
met. 31 no.4:71-73 Ap '58. (MIRA 11:5)

1. Institut gornogo dela AN SSSR i Iyngarskaya obogatitel'naya  
fabrika.

(Flotation) (Oleic acid)

AUTHORS: Klassen, V. I., Meshcheryakov, N. P. SCV/20-121-4-34/54

TITLE: Flotation of Mineral Grains Under  $10\ \mu$  by Gases Evolving From Solution (Flotatsiya zeren mel'che  $10\ \mu$  gazami, vydel'yayushchimiya iz rastvora)

PERIODICAL: Doklady Akademii nauk SSSR, 1958, Vol. 121, Nr 4, pp. 697 - 699 (USSR)

ABSTRACT: The lower limit of size of mineral grains which can be effectively separated by flotation is  $10\text{-}5\ \mu$ . The selection in the flotation of grains with a size beyond this limit is insufficient and their extraction is inconsiderably small. That is why precious ores of many deposits are nonworkable; in several dressing plants fine muds are practically not enriched. There are a number of opinions on the cause of this poor separation (Ref 1). These causes are due to physical factors; one of the most wide-spread factors is the low probability that the grains collide with air bubbles. The finest grains are carried away by the water current and do not touch the bubbles long and intimately enough to become attached (Refs 2-5). Already earlier the authors proved

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Flotation of Mineral Grains Under  $10\mu$  by Gases Evolving From Solution SOV/26-121-4-34/54

theoretically the necessity of the process mentioned in the title (Ref 9). In this case it is not necessary that the grains collide with the bubbles: The latter are formed on the sufficiently hydrophobic surface of the grains. Kinetics as well as mechanism of the formation of bubbles have been quite thoroughly investigated (Refs 1,9). In practical investigation the so-called "vacuum-process" was applied. Thus supersaturation of the gas solution was brought about in suspension by reduction of the pressure above the suspension. The possibility of using this process for grains below  $10\mu$  is denied; today the application of this process is practically abandoned (Ref 10). In the course of experiments with grains below  $10\mu$  the authors compared the two methods of: Vacuum and mechanical flotation. In the case of mechanical flotation air is dispersed by the mechanical effect of the medium. Figure 1 reveals a scheme for both methods. The process is described. Figures 2,3 show characteristic results. When studying the effect of waterglass the authors found that the vacuum method improves flotation considerably by increasing the barite or fluorite content

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Flotation of Mineral Grains Under  $10\mu$  by Gases Evolving SOV/20-121-4-34/54  
From Solution

by 15 - 20% and the extraction for 10 - 15%. In the diluted pulp the advantage of the suggested method appears in a particularly clear way. Flotation may be controlled by the degree of supersaturation of the solution with air (modification of vacuum). There are 3 figures and 9 references, 6 of which are Soviet.

PRESENTED: April 2, 1958, by A.A. Skochinskiy, Member, Academy of Sciences, USSR

SUBMITTED: April 2, 1958

Card 3/4

KLASSEN, Vili Ivanovich, prof., doktor tekhn.nauk; ZHEKDRINSKIY,  
Andrey Pavlovich; BERGER, Gennadiy Semenovich; ROMANOVA, L.A.,  
red.isd-va; SABITOV, A., tekhn.red.

[Using pneumatic machinery for the flotation of coal] Opyt  
primeneniia flotatsionnykh mashin pneumaticheskogo tipa dlia  
flotatsii uglei. Pod obshchey red. V.I.Klassena. Moskva,  
Ugletekhnizdat, 1959. 60 p. (MIRA 12:5)  
(Flotation--Equipment and supplies) (Coal preparation)

PHASE I BOOK EXPLOITATION

807/3644

Klassen, Villi Ivanovich, and Vladimir Alekseyevich Mokrousov

Vvedeniye v teoriyu flotatsii (Introduction to the Theory of Flotation), 2d ed., partly rev. and enl., Moscow, Gosgortekhnizdat, 1959. 636 p. Errata slip inserted. 3,000 copies printed.

Revisor of Ed.: V. I. Klassen; Reviewer: S.I. Krokhin, Docent; Ed.: A. V. Troitskiy; Ed. of Publishing House: M. L. Yezdokova; Tech. Ed.: M. K. Attopovich.

**PURPOSE:** This book is intended for scientific and technical personnel in the field of ore concentration. It may also be useful to students taking courses in flotation at mining, metallurgical, and other industrial institutes.

**COVERAGE:** The book explains the principles of flotation, based on recent investigations in the field. Matters such as flotation characteristics of minerals and water, bubble-attachment processes, operational properties of principal flotation reagents and the mechanism of their action, and pulp-aeration processes are discussed from the point of view of their interrelation. Practical conclusions are drawn from a number of theoretical assumptions. Personalities mentioned for their contributions in the field

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SOV/180-59-2-26/34

AUTHORS: Vlasova, N.S., Klassen, V.I., and Stepanova, Ye.N.  
(Moscow)

TITLE: Flotation Properties of Several Aromatic Compounds  
(Flotatsionnyye svoystva nekotorykh aromaticeskikh  
soyedineniy)

PERIODICAL: Izvestiya akademii nauk SSSR, Otdeleniye tekhnicheskikh  
nauk, Metallurgiya i toplivo, 1959, Nr 2, pp 139-143 (USSR)

ABSTRACT: Some polar and non-polar compounds were used in an investigation of the flotation of coal. The purity of the compounds was checked by a refractometer. The liquid reagents were used in the normal condition and the solid reagents as an aqueous solution. The investigation was carried out for the easily-enriched coal of the 'Sovetskaya' mine and for the coal more difficult to enrich on the Pastukhovka mine and the Karagandinskaya Tsentralnaya concentration factory. Flotation by benzol is shown in Fig 1. The extraction with 1 kg/ton is very low, 21.5%. Increasing to 5-10 kg/ton speeds up flotation but it still remains low. Benzol is very easily desorbed from the surface of coal. Addition of 0.5 kg/t. of phenol to Sovetskaya coal results in 80% extraction, but adsorption of phenol is extremely slow.

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Flotation Properties of Several Aromatic Compounds

Increase in concentration leads to increase in ash content of the concentrate (Fig 3). Fig 4 shows flotation by aniline. Fairly good results are obtained with 0.5 - 1 kg on easily enriched coal and 5 kg/t for other coals. The collecting properties of aniline are poor. Fig 5 is for p-toluene sulphonic acid. This shows less activity than aniline and has poor collecting properties. Fig 6 shows the flotation properties of benzilic acid which are quite good. With 0.2 kg/t, 80% of Sovetskaya coal is extracted, and 0.5 kg/T are needed for the other coals. The collecting action of benzilic acid is well known but the adsorbed layer is unstable. Thus the simplest aromatic compounds are poor in flotation unless a polar group is present. Polar groups such as amino- or sulpho-groups are not very effective. A hydroxyl group in the side chain gives good properties and although not as effective as the higher alcohols

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Flotation Properties of Several Aromatic Compounds

of the paraffin type, such compounds can be used in the  
flotation of coal.

There are 6 figures and 7 references (all Soviet).

SUBMITTED: August 23, 1958

Card 3/3

SOV/180-59-3-34/43

AUTHORS: Akopov, M.G., Klassen, V.I. and Plaksin, I.N. (Moscow)

TITLE: An Investigation of the Process of Separation of Particles in a Hydrocyclone During Beneficiation of Coal in Heavy Suspensions

PERIODICAL: Izvestiya Akademii nauk SSSR, Otdeleniye tekhnicheskikh nauk, Metallurgiya i toplivo, 1959, Nr 3, pp 156-163(USSR)

ABSTRACT: The influence of particle size of magnetite used for the production of heavy media and the variation of the density of suspension at various points of hydrocyclone were investigated. The results are shown in Fig 1 and 2 respectively. Some values of specific gravities of separation ( $\gamma$  gr/cm<sup>3</sup>) on beneficiation of coal in heavy suspensions of various specific gravities ( $\gamma$  g/cm<sup>3</sup>) are given:

$\gamma_0$  = 1.22 1.23 1.24 1.25 1.27

$\gamma$  = 1.39 1.42 1.48 1.51 1.63

Using the experimental results obtained, a method of calculating an approximate specific gravity of separation and the limiting size of grains is illustrated. An experimental investigation of the distribution of mineral particles during the beneficiation of a fine coal in heavy suspensions in hydrocyclone was also

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SOV/180-59-3-34/43

**An Investigation of the Process of Separation of Particles in a Hydrocyclone During Beneficiation of Coal in Heavy Suspensions**

separated. In the bottom part of the cyclone, the separation of intermediate fractions is continued and the separation of fine grains of rocks takes place, which moving upwards may enter the circulation. Simultaneously, with the separation of grains according to specific weight, the size segregation also takes place, however, on beneficiating of coal in heavy suspensions, the latter process is insignificant in comparison with the separation in water alone. There are 4 figures and 1 table.

**SUBMITTED: January 23, 1959**

Card 3/3

AKOPOV, M.G., kand.tekhn.nauk; KLASSEN, V.I., prof., doktor tekhn.nauk;  
LITOVKO, V.I., inzh.

Theory of the action of hydrocyclones. Obog. i brik. ugl. no.10:19-  
27 '59. (MIRA 13:9,

1. Institut gornogo dela AN SSSR (for Litovko).  
(Separators (Machines)) (Coal preparation)

KLASSEN, V.I., prof.; MAO TSEI-FAN' [Mao Chi-fan], insh.

Investigating the interaction of reagents and hematite by  
measuring the electrokinetic potential. Izv.vys.ucheb.sav.;  
gor.shur. no.10:154-159 '59. (MIRA 13:5)

1. Moskovskiy gornyy institut.  
(Flotation) (Hematite--Electric properties)

80V/136-59-1-8/24

**AUTHORS:** Klassen, V.I., Doctor of Technical Sciences, and  
Meshcheryakov, I.F., Engineer.

**TITLE:** Flotation of Fine Slimes with Air Coming Out of Solution  
(Flotatsiya tonkikh shlamov vozdukhom, vydelyayushchinsya  
iz rastvora)

**PERIODICAL:** Tsvetnyye Metally, 1959,<sup>3v</sup> Nr 1, pp 27-32 (USSR)

**ABSTRACT:** The authors note some published views (Refs 1-5) on the difficulty of flotating mineral crystals less than 10-5 microns in size and on the effectiveness of gas in the process (Refs 8,9,10). One of the authors (Klassen) has carried out a theoretical study of the latter aspect (Refs 5,8) and from this they now deduce that: gas bubbles are formed mainly on mineral particle surfaces, the process becoming more intensive the less hydrated the surface; the higher the supersaturation of water with gas the smaller the initial stable gas-bubble nuclei; the lower the surface tension at the liquid-gas boundary the smaller the nuclei and the more intensive the evolution of air particles. They go on to describe experiments which confirmed these deductions and brought

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Flotation of Fine Slimes with Air Coming out of Solution

to light new relations. In the first series of experiments gas separation from various solid-free solutions at various evacuations was studied in a simple apparatus (Fig 1). Fig 2 shows percentage of total originally dissolved gas that comes out of solution as a function of pine oil concentration, mg/litre for different vacua, the interrupted lines showing the corresponding theoretical percentage values. Fig 3 shows the volume of gas liberated, ml per l of solution as a function of vacuum, mm Hg, for various pine oil concentrations and also the initial and theoretical values. Bubble sizes were measured photographically and found to be mainly 0.1 - 0.2 mm in diameter. A further series of experiments were carried out with strong aqueous suspensions of barytes (65 - 70% - 10 microns): Fig 4 shows the total of originally dissolved gas coming out of solution as a function of sodium-cleate concentration, mg/l, and content of solids. In further experiments cinematography was used to study bubble-formation on grains of fluorite, quartz and barytes (left, middle and right, respectively, in Fig 5), the wetting angles having been determined previously.

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Flotation of Fine Slimes with Air Coming Out of Solution

All the experiments having indicated that the vacuum flotation of slimes should be effective, comparative tests of this and ordinary flotation were made. Samples of -10 micron (Table 1) quartz, fluorite, barytes and barytes ore as well as their mixtures were treated in an apparatus (Fig 6) suitable for both methods. The comparative tests were carried out under optimal conditions with careful reproduction in parallel tests of temperature, pulp density, reagent consumption, contact time, flotation time and quantity of final washing water. In general, concentrates richer by 10-20% and recoveries 10-15% higher were obtained by the vacuum method. Fig 7 shows results for barytes ore, where baryta recovery (curve  $\alpha$ ) and its concentration in the product (curve  $\beta$ ) are shown as functions of consumption of sodium silicate (g/tonne). The differences between the vacuum and ordinary methods were particularly interesting when tests were continued for 30 rather than the normal 10 minutes (Table 2).

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Flotation of Fine Slimes with Air Coming Out of Solution

The authors conclude that their results show vacuum flotation to be a flexible and promising method. There are 7 figures, 2 tables and 11 references, 7 of which are Soviet and 4 English.

ASSOCIATION: Institut gornogo dela AN SSSR (Mining Institute,  
AS USSR)

Card 4/4

AUTHORS: <sup>SOV/136-59-3-17/21</sup>  
Kakovskiy, I.A., Bessonov, S.V., Professor,  
~~Klassen, V.I.~~, Doctor of Technical Sciences and  
Livshits, A.K.

TITLE: On the Use of Radiography in Work on the Theory of  
Flotation (O primenenii radiografii v rabote po teorii  
flotatsii)

PERIODICAL: Tsvetnyye Metally, 1959,<sup>32</sup> Nr 3, pp 72 - 78 (USSR)

ABSTRACT: This collection of letters to the editor were written  
in connection with the publication by Tsvetnyye Metally,  
1958, April, of an article by Professor S.I. Mitrofanov.  
This criticised the use of radiographic methods of  
reagent distribution on the surface of the mineral  
particles.  
I.A. Kakovskiy suggests that since radiography and  
radiometry are the same in principle, Mitrofanov's  
critical remarks should apply to both. He considers  
however, that the experiments of that author were entirely  
unrealistic and unnecessarily complicated. He mentions  
his experiments which showed that it is impossible to  
wash xanthate off a polished silver plate. He also

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